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POLAR COLONIZATION.

THE PRELIMINARY

ARCTIC EXPEDITION

OF

1877.

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POLAR COLONIZATION.

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1877.

A number of public spirited and generous citizens of the United States, having faith in the success of the Colonization plan as a means of Arctic Exploration, and believing in its ultimate approval by Congress, in substantial accordance with the bill reported favorably from the Committee on Naval Affairs of the House of Representatives at the last session of the Forty-fourth Congress, contributed from their private means a sufficient sum for the purchase and outfit of a small vessel to be sent to the Arctic seas for the purpose of collecting such supplies during the ensuing winter as might be useful for the main expedition of 1878, if that expedition should be authorized. It was at first intended to limit the mission of this vessel to the collection of material only, but the opportunity for scientific investigation was so inviting, and the added cost incurred thereby so very trifling in comparison with the results to be attained, that space was made on board for two observers and their necessary apparatus. One of these observers was selected upon the recommendation of Professor Elias Loomis, of Yale College, and instructed to pay especial attention to meteorological phenomena, while the other was selected as naturalist of the expedition by Professor Spencer F. Baird, of the

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Smithsonian Institution, from whom he received special instructions.

Captain George E. Tyson, who served on board the *Polaris* with Captain Hall, was entrusted with the task of selecting a suitable vessel for the preliminary expedition, which, while large enough to accomplish the desired objects, would not exceed in cost the sum available for its purchase and outfit. After careful examination he selected the *Florence*, of New London, a schooner of fifty-six tons burden which was purchased upon his recommendation, and the work of strengthening her for ice navigation at once commenced under his personal supervision. It was at first hoped to have the vessel ready for sailing on the 25th of July, but the illness of Captain Tyson, and the prevalence of rainy weather delayed her until the morning of August 3d, upon which date she sailed with a full crew and complete outfit for one year's work, including the necessary apparatus for a whaling voyage on a small scale, as it is proposed that the vessel shall bring on her return voyage a cargo of bone and oil, and thus make the enterprise a self-supporting one, if possible.

The public interest evinced in the proposed Arctic Colony has been very gratifying from the first, and the fitting out of the preliminary expedition brought applications in great numbers, both personal and by letter, from parties desirous of accompanying it as members of the crew, as passengers, or in any capacity that would enable them to share in the prospective honors of the enterprise. The good material offered was so large that it made the selection a difficult task; but it is believed that no little band, better fitted for the work, by strong frames, courage, and endurance, have ever gone forth to the Arctic Seas than those who sailed upon the *Florence*. The officers and crew are as follows:

George E. Tyson, New London, master; William Sisson, New London, first mate; Dennison Burrows, New London, second mate; Eleazer Cone, New London, steward; Orray Taft Sherman, Providence, meteorologist and photographer;

Ludwig Kumlein, Madison, Wis., naturalist; Richard B. York, Norwich; William A. Albin, Sag Harbor; James W. Lee, New London, and Joel B. Bottles, of Granby, seamen. Charles Henry Fuller, Colchester; David E. Keese, York, Pa., and John McParland, New London, green hands. Of the crew the youngest is nineteen years old, and the oldest only twenty-four.

The *Florence* is a good sea-boat, staunch, stout, sea-worthy, and a fast sailer, and has been thoroughly strengthened for her encounters with the ice. The supply of provisions and other stores for officers and crew is ample for twelve months, and can, if necessary, be made to last six months longer. Kind friends from all parts of the country have contributed from their stores, in addition to articles of food and clothing, a liberal supply of books and papers to wile away the long, weary hours of the sunless Arctic winter. A spare berth in the fore-castle is filled with story-books, histories, novels, and volumes of poetry: a large trunk is filled to overflowing with papers, and still another is loaded down with magazines; the whole making a library of considerable dimensions. The heads of several Departments of the Government have shown a kindly interest in the expedition, not merely by verbal approval, but by substantial aid. The different bureaus of the War Department, acting under the authority of the Secretary of War, have been particularly active in the matter. The Ordnance Office furnished rifles and muskets, and necessary ammunition. The Chief Signal Officer of the Army supplied a complete outfit of necessary instruments for making meteorological observations. The Surgeon General furnished a supply of medicines and the necessary minor surgical instruments for use in case of accidents to members of the expedition, and the Quartermaster General furnished tents and camp equipage. The Secretary of the Navy furnished a complete outfit of maps, charts, and sailing directions. To these heads of Departments and Bureaus the grateful thanks of the friends of Arctic Exploration are due for their timely and efficient aid. The citizens

of the United States, from all quarters and all directions, came forward with contributions in money or in kind, in support of the undertaking. No better test of the interest felt in the subject, and the conviction entertained of its importance and the ultimate success of the main expedition, could be found than in this widely spread and voluntary support. Many of these contributions were accompanied by letters filled with prayers for the success of the undertaking. All classes of the community, and all portions of its territory were represented in these donations; and it would be invidious to name those who gave largely, while so many gave, from their humble store, what may most aptly be termed "the widow's mite."

The following instructions, furnished to Captain Tyson upon the day of sailing, will give an idea of the aim, objects, and scope of this preliminary expedition.

WASHINGTON, *July 19, 1877.*

CAPTAIN GEORGE E. TYSON,

Commanding Preliminary Arctic Expedition of 1877, New London, Conn.

SIR: The command of the schooner *Florence*, of the Preliminary Arctic Expedition of 1877, is intrusted to you, and the officers and men forming the crew are enjoined to render strict obedience to your orders.

In the event of your death while on this expedition—an event which is to be devoutly hoped may not occur—the command will devolve upon the first mate, and should he also be disabled or die, upon the second mate; and such survivor will carry out, to the best of his ability, the objects of the expedition, keeping a stout heart and committing himself and comrades to the care of Divine Providence.

THE OBJECT OF THE EXPEDITION.

The primary object of the expedition is the collection of material for the use of the future colony on the shores of Lady Franklin Bay. This material will consist of Esquimaux to the number of ten families—if that number can be obtained of young, strong, healthy persons willing to be transferred to the location of the future colony—of dogs, not less than twenty-five in number, mostly females, and selected for their docility, training, strength, and endurance; of sledges, two in number, and completely and carefully fitted up for

travel, and of clothing in ample quantities to supply fifty persons for three years. The clothing will be carefully selected, of choice furs and skins, and all made up by native women. The secondary object of the expedition is the collection of scientific data and specimens, as the field is a new one and possessing unusual interest.

WHALING EN VOYAGE.

The third, and to the crew most interesting object, is the capture of a sufficient amount of bone and oil to make a profitable return cargo, and this part of the work is so completely within your own province that I will not venture to give any instructions. I must caution you, however, to be on your guard against letting the pursuit of gain interfere in any manner with the successful issue of the two first named objects of the expedition. It is from them that the lasting results of the voyage will be obtained, and the interests of science and commerce best subserved. The precise locality of your winter quarters is left in a great measure to your judgment, but should probably be on the northern side of Cumberland Island. In making the selection, if the state of weather and condition of the ice leaves any choice, the locality should be that which is best adapted for the collection of supplies, and which offers the best facilities for breaking out in the summer of 1878, in time to reach Disco by August 1, if possible, and certainly not later than August 6.

CARING FOR THE NATIVES AND DOGS.

Provision must be made for the proper maintenance and care of the natives who are to become members of the future Polar Colony; and also of the dogs, which are to form so important a part of the outfit of that colony. They must be quartered as comfortably as the limited accommodations of the schooner will permit, fed well and kept thoroughly clean.

THE SCIENTISTS.

The two scientific members of the expedition, while not forming, strictly speaking, a part of the crew, will, in case of necessity, be required to perform duty, and will at all times be subject to your orders and discipline. Every proper facility will be given them in the discharge of their respective duties and to aid in securing full and valuable results from their labors. Mr. Sherman will have charge of the meteorological instruments, observations and records, and of the photographic apparatus and work. In both of these duties it is my wish that you should aid him, cheerfully and constantly, and in the event of his sickness or inability, from

any cause to attend to his observations, to make such arrangements as will insure a continuous series of the most important ones. The utmost caution must be exercised in handling the delicate instruments, to guard against their breakage or other injury and the consequent interruption of the observations. The results of the photographic work will be very interesting to the general public as well as to the scientific student, and every opportunity should be taken to secure good negatives of places, localities and objects, and also of the different operations connected with the pursuit and capture of whales, seals, &c. Mr. Kumlein, who goes as the representative of the Smithsonian Institution under the instructions of Professor Spencer F. Baird, the distinguished naturalist, for the purpose of collecting specimens of the flora and fauna of the country, will be accorded the most ample facilities for the performance of his duties consistent with a proper regard for the main object of the expedition. His labors, if properly supported and reasonably successful, will prove, it is hoped, of lasting advantage, and make the expedition a notable one in scientific annals.

THE EXPEDITION OF 1878.

On reaching Disco in August, 1878, if the vessel carrying the members and outfit of the colony has arrived, you will transfer to such vessel the Esquimaux, dogs, sledges and clothing collected for the purpose, and take the commanding officer's receipt for the same. This being done, you will return as rapidly as possible to New London, whence you will report by telegraph to me at Washington, D. C., for further orders. If the colonization vessel has not arrived you will wait for it until August 15, when you will store the sledges and clothing to the care of the Governor of Disco; leave the dogs also in his care and return the natives to their home on Cumberland Island. This done you will return to New London and report, as before, for instructions.

Should any of your crew wish to accompany the colonization you will grant them permission to do so, with the consent of the commander of that expedition, and provided you retain enough men to bring the *Florence* safely back to the United States.

TEMPERANCE.

Great care must be exercised in the use of spirituous liquors, both among the members of the expedition and in dealing with the natives. Useful as liquor undoubtedly is in its place, and under suitable restrictions, it is easily capable of

the most frightful abuse and of leading this expedition to disaster as it has done others in the past. I trust in your strong good sense and past experience to guard against danger from this source, and desire you to know that I have only permitted a supply in quantity of liquors to form part of the *Florence's* outfit in deference to your own strongly expressed wishes.

DEALING WITH THE ABORIGINES.

In dealing with the natives, it is my wish, as doubtless it is your inclination, that you should be kind and liberal to the extent of your means and ability, and in all points of difference, should any arise, to be just but firm.

FINAL.

Bear constantly in mind the fact that this is not a whaling voyage, but the first step in a work that will, I trust, when completed, be a noteworthy one in the annals of geographical and scientific discovery. This fact should also be carefully impressed upon the crew, in order that they may work intelligently and with proper interest.

Be careful of the health of your men, using such measures for the purpose as your long experience in Arctic waters suggest as necessary.

In conclusion, I commend yourself and crew to the care of an All-wise Power, with the prayer that your voyage may be prosperous and your return a safe and happy one.

H. W. HOWGATE,
United States Army.

INSTRUCTIONS TO THE METEOROLOGIST.

WASHINGTON, D. C., July 10, 1877.

MR. O. T. SHERMAN,

*Meteorologist, Preliminary Arctic Expedition of 1877,
New London, Conn.:*

SIR: The accompanying instructions were kindly prepared by Professor Cleveland Abbe, and are furnished you as suggestions for your general guidance in making meteorological observations. These suggestions may possibly be modified of necessity by varying circumstances and conditions, but should not be departed from in any important degree:

1. It is considered very desirable to maintain a system of regular hourly observations night and day, for the record of which the accompanying blank book will serve as the first volume, one horizontal line being devoted to each hour, and at least four pages devoted to each day's record, so that both regular and miscellaneous observations and notes may all appear together in the same book.

Even if hourly observations cannot be maintained regularly by yourself and those of the ship's crew who can assist you, still it will be best to rule the book as for hourly observations, and attempt a bi-hourly or a tri-hourly series, filling in intermediate hours whenever possible.

2. As regards the time to be used in recording observations, it is especially enjoined that you do not attempt to employ local times, but that you uniformly employ the Washington mean time as given by the ship's chronometer, and to which your own watch should always be regulated. Furthermore, it is evidently of little importance whether the series of observations are made at the beginning of each hour or at some other minute, and it is therefore preferred that your regular records be made at 0.35 A. M., 1.35 A. M., etc., dating them, of course, according to civil reckoning, by which means three of your observations will become simultaneous with those of the Signal Service, and will thus form a valuable addition to its bulletin of international simultaneous observations.

3. Accompanying this you will find a schedule suggesting that arrangement of the vertical columns on each page, which experience has shown to be most convenient. The contents of these columns are as follows:

1. Hours of observation.
2. Attached Thermometer.
3. Reading of the Barometer.
4. Barometric Corrections and Reductions, viz:
Correction for Instrumental Error.
Correction for Temperature.
Reduction to Sea Level.
5. Atmospheric Pressure at Sea Level, or the Barometer as corrected and reduced.
6. The Dry Bulb Thermometer.
7. The Wet Bulb Thermometer.
(Both should be read to tenths of a degree.)
8. Relative Humidity.
9. Force of Vapor.

10. Dew Point. (8, 9, and 10 taken from Guyot's Regnault.) 11. The reading of the Hair Hygrometer. (If possible, several of these will be furnished for comparison.)

12. True Direction whence the Wind Blows.

13. Estimate Force of Wind (on the International scale of zero to ten.)

14. Reading of the Anemometer Dial. (If possible, two anemometers, one elevated much higher than the other, should be used. The simple, single reading of the dial running up to 9999 is all that need be recorded, as the hourly and daily velocities can be deduced subsequently.)

15. Repetition of column 1.

16. The Amount (in tenths,) kind and direction of the Upper Clouds. (Pay close attention to the direction, and record it with reference to the true meridian of the sixteen compass points; give the direction whence the clouds move, and, to secure accuracy, have a fixed point, on the earth by which to judge of their motions.)

17. Ditto for the lower clouds. (If three layers are seen, record the middle one in the miscellaneous notes.)

18. The color of the sky near the zenith, as compared with the standard scales B., R., or G., (blue, rose, gray.)

19. Ditto for the zenith distance 45° .

20. The Weather—that is to say, the most striking characteristics of the weather.

21. The fall of Rain, or heavy mists, during the preceding hour.

22. The fall of snow and sleet unmelted.

23. The amount of melted snow and sleet. (These observations can be made on ship-board to a considerable advantage by placing two or four rain gauges symmetrically on the starboard and larboard.)

24. The Record of the Tide Gauge. (This very important observation should be carefully attended to whenever on shore or frozen up during the winter.)

25. Temperature of the ocean water near the surface.

26. Temperature of the ocean water at constant depth of about twenty feet.

27. The color of the ocean water as compared with standard scales, G., B., Y., and R., (green, blue, yellow, and red.)

28. Direction and Intensity of the ocean swell or waves.

29. Repetition of column 1.

30. The Deviation of the magnetic needle. (For this observation a delicate compass needle will serve if no appro-

appropriate magnetic apparatus can be obtained. Its fluctuations will probably be quite decided during Auroras.)

31. The visibility of Auroras, Halos, Zodiacal Light. (The three phenomena should be carefully looked for on all occasions, and if visible, the appropriate word or the corresponding symbols agreed upon at the Vienna Congress should be entered in this column, reserving a fuller description for the miscellaneous notes.) Aurora, Lunar Halo, Solar Halo, Lunar Corona, Solar Corona.

32. Regnault's apparatus for observing the Dew Point should be employed systematically, if any way possible to do so.

33. Among the specially interesting observations is that of the actual height of clouds and direction of air currents, as revealed by sending up small balloons, which are furnished you for this purpose. Attach to each balloon a light thread, one hundred feet long, in such a manner that it will pull away at the slightest tension. Hold the other end of the thread fast in the fingers, and count seconds from the watch while the balloon is ascending. Record in column 33 the number of seconds required to ascend 100 feet, which is the vertical velocity of the balloon.

34. The horizontal direction taken by the balloon.

35. Its horizontal velocity, as estimated by comparison with the surrounding country.

36. The time elapsing before it disappears in the clouds.

37. The Density of the sea water.

Columns 1 to 14 occupy page 1; columns 15 to 28 occupy page 2; columns 29 to 37 occupy portion of page 3. The rest of page 3 and the whole of page 4 of each day's record is to be occupied by short miscellaneous notes, among which are to be included the latitude and longitude of the vessel when at sea. If you visit any port at which meteorological records are kept, you should not fail to compare your instruments with those used at such places, as a check upon the agreement of the records.

Among the numerous miscellaneous observations that are desirable from northern latitudes are many that will be found referred to in the Manual and Instructions for the Arctic Expedition of 1875, to which you are hereby referred, as also to the reports of the Permanent Committee of the First International Meteorological Congress at Vienna:

(Page 1.)

1877, August 7, Monday, at sea, &c.

WASHINGTON TIME.	BAROMETER.				PSYCHOMETER.				WIND.	
	Attached thermometer.	Barometer.	Corrections and reductions.	Barometer corrected and reduced.	Dry bulb.	Wet bulb.	Relative humidity.	Force of vapor.	Dew point.	Bar Hygrometer—Relative Humidity.
Hours.										
12h. 35m. A. M.	2	3	4	5	6	7	8	9	10	11
1h. 35m. A. M.										12
2h. 35m. A. M.										13
										14

(Page 2.)

1877, August 7, Monday, at sea, &c.

WASHINGTON TIME.	UPPER CLOUDS.			LOWER CLOUDS.			COLOR OF SKY.		RAINFALL.				OCEAN.			
	Amount.	Kind.	Direction.	Amount.	Kind.	Direction.	Zenith.	Forty-five degrees.	Weather.	Snow and Sleet.		Tide regular.	Temperature.		Color of water.	Swell or waves.
										Not melted.	Melted.		Surface.	Deep.		
12:35 A. M.							18	19	20	21	22	23	24	25	26	27
1:35 A. M.	16			17												28

(Page 3.)

1877, August 7, Monday, at sea, &c.

WASHINGTON TIME.			Deviation of magnetic needle.	Aurora, halo, zodiacal light.	Regnault's dew point.	SMALL BALLOONS.				Density of sea water.
						Vertical velocity.	Horizontal.		Difference in clouds.	
						Direction	Velocity.			
	30	31			32	33	34	35	36	37

(Page 4.)

1877, August 7, Monday, at sea, &c.

Short miscellaneous notes.

In addition to the foregoing the following suggestions of Prof. Loomis are furnished for your information and guidance :

"The meteorologist should be specially instructed, not only to make the routine observations at fixed hours, but also to be constantly on the watch for every unusual phenomenon connected either directly or remotely with meteorology. He ought to keep a detailed record of all auroral phenomena, and it is extremely desirable that the expedition should have suitable instruments for the declination of the needle, and the changes which accompany auroral display. I think particular attention should be given to observing the direction of the wind, and also the direction of the highest visible clouds, and their direction ought to be recorded with great precision. Especial attention should be given to the optical phenomena of the atmosphere, such, for instance, as halves-parhelia, &c. The Polar regions exhibit phenomena of this class more remarkable than those we often see in the middle latitudes, or, perhaps have ever seen, and these observations, to be of much value, should furnish precise measurements of the dimensions and portions of whatever is observed, particularly of those features which are most unusual."

These special suggestions, with such general ones as you will find in the Arctic Manual, in Prof. Loomis' Work on Meteorology, in Buchan's Handy-book, and the other works on Meteorology which have been furnished to you will be sufficient to indicate the extent of the work to be done, and its most valuable features. It is especially impressed upon you to keep full and detailed notes of all items of daily, observation and occurrence, in order that nothing of value may be lost. The memory must not be trusted for details, but everything intended for future use should be committed to writing at the time the matter is fresh and capable of verification.

H. W. HOWGATE,
United States Army.

Memorandum addressed to J. Kumlein, Naturalist of the Expedition, relative to the Natural History of the region to be visited; by Spencer F. Baird.

The region you visit is one of the most interesting in North America, and the least explored by the naturalist. It will furnish an ample field for research, especially as you will be on shore during the greater part of your absence from the United States.

Your principal object should be to make collections of everything in the ethnological, animal, vegetable, mineral, and fossil departments; so that you can prepare a report thereon, perhaps an illustrated one, to be published in some suitable manner upon your return. In view of this you should make copious notes of the habits, associations, and general condition of everything that you meet with.

Of mammals, good mountable skins of the polar bear, prepared with alum or saltpeter, will be desirable. A series of reindeer should also be obtained, as well as foxes, hares, and other animals. A good series of seals properly prepared will enable us to solve many questions in regard to our own species at home.

The walrus, both male and female, should be procured.

As many skeletons as are procurable, and several skeletons of all land and water mammals will be readily marketable.

The skins of cetaceans cannot readily be preserved unless possibly they can be preserved in salt. Sketches should be made of the outlines and distribution of color of each, and the corresponding skulls and skeletons should be preserved.

Particular attention should be paid to the narwhal, skeletons of which are much in demand.

If opportunity is allowed you, some skulls of the smaller whales ought to be procured.

Regarding birds, a special memorandum, prepared by Dr. Brewer and myself, has been furnished. You will, of course, look very carefully for the small insectivora and conirostres, to determine, as far as possible, the northern distribution of our species. *Saxicolus* will probably be frequently met with.

Of water fowl, the rarer geese, the Labrador duck, Sabine's and Ross's gulls, and the Ivory gull are those which it is most desirable to obtain.

Any petrels or shearwaters will also be of interest.

Endeavor if possible to obtain specimens of black guillemot, with a blackish bar partly across the white of the wing.

Reptiles you will probably not find, unless it may be a frog, which of course should be secured.

The fishes should be looked after very particularly, and especially the different species of trout, salmon, and white fish, which should be secured, if possible, of different ages and in the different seasons, to show the variations of the spawning condition.

Any large salmon or trout, say over a pound or two in weight, would be better preserved by being skinned and the skins put in alcohol, although a sketch of the original ought to be made. Any other species of fish you had better procure as they may present themselves.

Of course it will be important to obtain a full representation of the insects of the country, such as butterflies, beetles, etc.

Whatever species of marine invertebrates are procurable should be gathered in; for example, star-fishes, shells, crustaceans, and the like.

If you should succeed in securing a complete series of all the varieties of animal life, if possible in several sets, the great object of your mission will have been accomplished.

You should endeavor to secure a variety; but a complete collection will be of much interest. Any choice mineral specimens ought to be obtained, especially of the crystalline varieties. Get samples of all the rocks constituting the strata. These should be sketched, with their overlying position indicated and verified by specimens.

Look very carefully for rocks containing fossil remains, either of plants or of animals. Some very interesting specimens of saurians have been brought from different portions of Arctic America, while the fossil plants are of very great importance.

Make a thorough study of the ethnology of the country, securing as many crania of Esquimaux as practicable; procure skeletons also if they can be got. Illustrations of the handiwork of the natives in objects of stone, bone, wood, etc., ought to be carefully gathered, especially any that are of great antiquity, and such as are superseded by modern articles.

SPENCER F. BAIRD.

Salem, Mass.

The following extract from the *London Standard* of August the 18th, is of interest, as showing the appearance of things on board the *Florence* when about to sail:

"An occasional correspondent writes from New York: On the morning of Tuesday, the last day of July, I saw an announcement in the *New York Herald* to the effect that the Arctic exploring ship *Florence*, under the command of Captain George E. Tyson, would sail from New London on the following day. I immediately resolved, as a member of the last British Polar expedition, to go down and give him and his comrades a hearty farewell and God speed. I took a passage in the handsome steamer *City of New York*, and leaving New York city in the evening woke next morning at New London. It is a pretty little town of 12,000 people, situated on the Thames, a fine river, wider than the English one after which it is named. New London is of considerable importance as a seaport, and you meet there a number of persons who have been actively employed in whaling and sealing. Inquiring my way to Haven's Dock, where the *Florence* lay, I soon found her alongside the jetty, some caulkers closing the hold, and the men carrying on board their beds and clothes bags. On the upper deck were some casks of water and barrels of biscuits, firmly lashed; also planks and spare spars. The *Florence* is quite a small vessel, a schooner of 56 23-100 tons. She has storage capacity for 300 barrels of oil. She was built at Wells, Maine, in 1851, but is still a staunch craft and good sea boat. Preparatory to her last cruise she was thoroughly overhauled and renovated, and made as good as new. Her length is 64 feet, beam 19 feet, and she has a depth of 7 feet. She carries no foretopmast, and is an aft schooner with a square sailyard athwart. Stepping across a plank, I gained the deck, and going aft, discovered the officers' cabin. It is a small space, measuring about eight feet in all three directions, and having a small table in the centre; overhead were stowed half a dozen Springfield rifles and a double barrelled gun. On each side of the cabin are two bunks, one above the other. Those on the port side are appropriated to the use of the scientific officers, and the other two to the second mate and steward. When I was there the former gentlemen were busily engaged in stowing their effects in their bunks under their beds. Tins of sar-

dines, novels, and newspapers were oddly mingled with articles of clothing and scientific instruments.

There appeared to be plenty of space, but imagine the labor of constantly having to disarrange the entire collection in order to obtain some trifle which happens to be placed at the bottom! Aft of the cabin, and on either side of the entrance to it, are two "state rooms"—a pretentious title for little dens of six feet by four, half of which limited space is occupied by the bed placed over a small chest of drawers. These sanctums are designed for the captain and first mate. On the other side of the cabin is the kitchen, a little chamber not five feet high or four feet wide. The crew, of whom there are eight, are located in a small cabin in the bows; they have good, wide bunks, which appear comfortable enough. The walls of the officers' cabin are of 4 inch plank. The stem has been replanked with 10-inch timbers, covered with 2-inch planks, giving her bow a total thickness of sixteen inches, sufficient to resist the blows from floating masses of ice which she may expect to encounter in the North. She carries a sufficient stock of provisions, pork, canned meats, biscuits, and spirits; also 15 tons of coal. She is well provided with ammunition, having 6,000 ball cartridges, 1,000 pounds of buck shot, two barrels of powder, and 200 pounds of rifle powder. She also takes plenty of whale line, as she hopes to secure some whale's in Baffin's Bay. The *Florence* carries three boats, one hanging astern from davits, and one on each quarter. The Stars and Stripes floated bravely at the masthead; the morning was bright and fine, and a number of spectators came on board to see the vessel, or stood on the jetty discussing her chances. Captain Tyson is accompanied by William Sisson, a portly native of New London, as first mate. Dennison Burrows, of New London, is second mate, and Eleazer Cone, also of New London, is steward. Mr. Orray Taft Sherman, of Providence, a graduate of Yale, '77, and a fine, tall young man, undertakes the duties of meteorologist and photographer, whilst Mr. Ludwig Kumlein, of the Smithsonian Institute, is naturalist.

The crew consists of eight fine young fellows of from 19 to 24 years of age, with one exception all natives of New London, and accustomed to a seafaring life. They seemed to me the right men for the work, and had only been engaged on the day before I visited the ship. Asking one of them what his pay would be, he replied, "A fiftieth."

When I said "What of?" he replied, "I don't know and care less." They seemed equally indifferent as to when they return, but have the option of coming back next year.

I afterwards crossed the river in the ferry to call on Captain Buddington, who was sailing master under Captain Hall in the *Polaris* in 1871, and took the command after his death. Asking to be directed to the Captain's residence, which is a mile or so from the town, I was offered a seat in his buggy by a gentleman who was driving that way, with that kindness which is so pleasing a characteristic of the educated American. There we found the worthy Captain amusing himself, as many old sailors love to do, by working in his garden in the cool of the evening. On my introducing myself he welcomed me into his comfortable cottage, where we conversed for some time on Arctic work and enterprise. He is deeply interested in the matter, though, after 40 years' work amongst the ice in the Northern and Southern seas, he justly thinks himself entitled to end his days in the peaceful serenity of a rural life. On my rising to go he kindly accompanied me half way to the town, and there Captain Tyson came on board the steamer, and wished good-bye to Captain Howgate and myself, as we were returning to New York.

The *Florence* had been unable to leave, because of the state of the wind, but it was intended that she should weigh anchor next morning. May this expedition advance a step further than its predecessors into the unknown regions, and add more facts to the sum of human knowledge."

At ten minutes past ten, on the 3d of August, the tug took her in tow, and with a stiff fresh breeze filling all her canvas, and keeping her bow for bow with the steamer, she went flying down the harbor, dipping her colors in farewell to friends on shore, who watched her out of sight. On board all was snug and ship-shape; both officers and men were impatient of the delay which they had met with, and gladly saw the tug steaming out to take her in tow. A fact pleasant to be remembered was the absence of any appearance, much less the reality, of any intoxication amongst the crew of the little vessel.

The following communication from Captain Tyson was received on the 26th of August:

SCHOONER FLORENCE, August 9, 1877.

Captain H. W. HOWGATE,

United States Army, Washington, D. C.

SIR: I have the honor to report the progress of the Preliminary Polar Expedition.

August 2, half past ten A. M., we left New London, with the wind to the northeast. The progress made on the succeeding days and the facilities for sailing will be shown by the following citation from the log:

August 3.—Lat. 40 52, lon. 70 36; wind N. E.; course, magnetic, S. E.

August 4.—Lat. 40 40, lon. 68 50; wind N. E.; course, E. S. E.

August 5.—Lat. 41 52, lon. 67 19; wind N. E.; course E. by N.

August 6.—Lat. 43 13, lon. 65 1; wind N.; course E. by N.

August 7.—Lat. 44 24, lon. 63 36; wind S. W.; course E. by N. half N.

August 8.—Off Beaver Island light; becalmed in fog.

August 9.—Lat. 45 9; off Cape Canso; calm.

THROUGH THE STRAITS OF BELLE ISLE.

It is intended to sail across the Gulf of St. Lawrence and through the Straits of Belle Isle, for thus we hope to save time and be rid of much bad weather.

Although it is now a week since we left port we have missed nothing essential from the equipment. The vessel meanwhile has behaved splendidly, and the crew have shown themselves to be composed of good working material.

In the scientific department work has also advanced, though more slowly, since it has been thought inexpedient to place the instruments. A bird of a rare species has been obtained. All of us are hopeful of success.

Very respectfully,

GEORGE E. TYSON, (off Cape Canso.)

On the 22d of November, a letter was received from the hardy navigators which, as given below, will probably be the last that the world will hear from the *Florence* for many months to come:

NIUNTILICK HARBOR, CUMBERLAND GULF,

September 29, 1877.

Captain H. W. HOWGATE,

United States Army, Washington, D. C.:

DEAR SIR: After a long and tedious passage of forty days we reached our present harbor on the 13th of September,

and I avail myself of the first whaler returning to Scotland to communicate with you and our friends at home. I do not find matters here as I had hoped, owing to the presence of a large number of whalers and but few natives. This will make great competition for the trade of skins and other material, and compel us to pay higher prices than would otherwise have been the case. To avoid this I would have gone to another harbor had it been a little earlier, but now it is too late to attempt a change. * * * I shall soon move the vessel into winter quarters at the head of the gulf, where I hope to be more successful.

* * * * *

HEALTH OF THE CREW.

The health of the men continues excellent and our supplies prove of good quality and in abundance. All feel confident of making the expedition a profitable one, even if we should fail in collecting all the stores called for in your instructions. But we shall endeavor to accomplish all you could wish us to do.

WORK OF THE EXPEDITION.

Mr. Sherman has got fairly at work making observations, and has obtained some good photographs of whaling and native scenes. Mr. Kumlein is busy, and is adding to his collection constantly, although a little disappointed at finding the number of rare specimens fewer than he had expected to find them. It is yet too early to say how we shall fare, but when the first feeling of homesickness wears off and the men recover from the strain of the long voyage, matters will look brighter to them, and they will work with renewed energy.

With good wishes to you and to all our friends at home, I remain, with great respect,

GEORGE E. TYSON.

It is hoped that the return log and history of the *Florence's* voyage will contribute to a more minute knowledge of Arctic phenomena, meteorology, flora, mineralogy, and ethnology. As an advance-guard and pioneer of the main expedition, its advantages and assistance will be valuable. Upon the arrival of the main expedition at Disco, the point of meeting, its members will find awaiting them, it is hoped, suitable clothing for Arctic wear, sledges, trained dogs, Esqui-

maux guides, hunters and fishermen, and also several hardy well-trained and thoroughly acclimatized Arctic seamen, as there is little doubt that some of the *Florence's* crew will decide to cast in their lot with the main expedition. The latter will also have at their command, and for their guidance the information, experience and scientific data gathered by the preliminary expedition. In a word, the later comers will find much of their most important routine work of preparation and supply done for them and ready to their hands, and will thus be enabled to enter upon the more arduous portion of their undertaking with lighter hearts and with that assured confidence which is the pledge and presage of success.

The dreary veil of the long, sunless Arctic winter has closed behind the brave and hardy navigators of the *Florence*, hiding them for a season alike from our gaze and from our communication. What perils they may meet, what dangers encounter, what sufferings endure, must remain a sealed book to us until the icy barriers, to which their little craft has been already moored, shall be unlocked by the sun of another summer.

Shall we leave unfinished the noble work which they have so gallantly commenced? Surely not. The eyes of our own millions, with those of the whole civilized world abroad, have watched the outgoing of the *Florence* with her hardy crew, and we should be false indeed, alike to our past history and our future fame, if we should pause in the work of Arctic discovery so auspiciously begun. Private means and private enterprise are good and noble things in themselves, and they have placed in the Nation's hands, for her fostering care and rearing, this ward of science, with the hope that the work so fairly commenced will be pushed to an early and glorious issue. This is a national cause and undertaking; one peculiarly American, whose goal lies where the lonely tomb of the martyred Hall, with its kindly English memorial, stands, a solitary sentinel, upon the road to glory. Other nations are taking the field; foreign expedi-

tions are in preparation, and shall we content ourselves with taking a preliminary step and then abandoning the race? With the members of the Senate and of the House, rests the decision of the question. The bill which is now before them provides for following up this great enterprise at an insignificant cost compared with the vast harvest to be reaped, not only in the fields of science, but in the interests of navigation, commerce, and national glory.

H. W. HOWGATE.

APPENDIX 1.

The following is the report made by the Naval Committee upon the bill to authorize the expedition:

HOUSE OF REPRESENTATIVES.

44th Congress, 2d Session. Report No. 181.

EXPEDITION TO THE ARCTIC SEAS.

FEBRUARY 22, 1877.—Recommended to the Committee on Naval Affairs and ordered to be printed.

Mr. WILLIS, from the Committee on Naval Affairs, submitted the following Report: [To accompany bill H. R. 4,339.]

The Committee on Naval Affairs, to whom was referred the bill (H. R. 4339) to authorize and equip an expedition to the Arctic Seas, submit the following as their report:

That the object of the bill, "to authorize the President to fit out an Expedition to the North Pole, and to establish a temporary colony for purposes of exploration," is so interesting and important in its character that they have, while not neglecting to gravely consider it with reference to its results both to science and commerce, availed themselves of all information accessible, and called in requisition the testimony and experience of men pre-eminent in scientific experience and learning, whose communications are hereto appended and made a part of this report.

The first inquiry pursued was whether, within the purview of the Constitution or otherwise, to fit out an exploration such as the bill proposes was an appropriate, legitimate function of the Government, for the exercise of which taxes could be properly levied upon the people; and, if so, whether the nation would get value received for the expenditure incurred, and the perils to which its citizens would be exposed.

In reaching a determination, the fact has not been considered that there are numerous precedents in our history precisely covering the present case, to wit, the joint resolution authorizing the acceptance of Mr. Grinnell's vessels,

approved May 2, 1850; the resolution respecting the Kane expedition, approved February 8, 1855; the Hall (Polaris) expedition, (see legislative, executive, and judicial bill, approved July 12, 1870;) the Wilkes exploring expedition, approved May 14, 1836, (see naval appropriation bill of that year.)

The action of the Government in the foregoing instances indicates the views of previous Congresses respecting such a measure, as all such expeditions have been conducted under the auspices of the National Government. Nor has any importance been attached to the action of other governments, who not only heretofore have inaugurated such enterprises, but are contemplating the inauguration of others on a magnificent scale.

We have ascertained, to our satisfaction, that the results yielded by prior explorations in the Polar Seas have incalculably benefited the whole world; that the knowledge acquired by experiment and discovery in that region can be obtained in no other way and in no other section of the globe; that such knowledge is an important factor in the regulation of commerce, which is absolutely dependent, so far as decreasing the perils of the deep and enlarging the boundaries of navigation are concerned, upon the knowledge of physical laws.

The Constitution gives Congress power, in section 8 of article 1—

To regulate commerce with foreign nations.

And also in the same section and article—

To make all laws which shall be necessary and proper for carrying into execution the foregoing powers.

So the question as to the power of the Government is without the domain of doubt or discussion.

The Government has the constitutional power. Is it proper to exercise it?

Whatever benefits are harvested favor no special interest or class. The added knowledge obtained is the property of mankind.

Give a subsidy, you enrich a corporation by extorting from the body politic. Impose a duty for the purpose of protecting a particular industry, you enrich a few while you impoverish the many. Explore the remote corners of the earth, you awaken inquiry, add to the stock of information, and contribute essentially to man's mastery over the elements.

None among those who believe that money is well ex-

pended to increase knowledge, to improve the chances of life, to enlarge the commerce of our nation, and who appreciate the notable results already achieved in this special field of adventure and study, will belittle or sneer at the enterprise proposed in this bill. Some declare, by way of depreciation, that failure and disaster have been the reward of the dauntless explorer. In a certain measure, true. But the ends aimed at are worthy of sacrifice. Hall and Franklin died just as gloriously, just as serviceably, just as heroically, as Warren at Bunker Hill or Sedgwick at the Wilderness.

Valuable experience and information have been obtained within past years which are now at the service of any new explorer, and new plans based on such experience and information have been examined by your honorable committee, which point out the causes that have hitherto contributed to disaster and partial failure.

This plan is known as "Polar Colonization," and has received hearty indorsement from such distinguished experts, scientists, students, and explorers as Professor Joseph Henry, president of the National Academy of Sciences; Professor Loomis, of Yale College; President Potter, of Union College; Admiral Porter; Rear-Admiral Davis, superintendent of the National Observatory; Hon. Charles P. Daly, president of the American Geographical Society; Dr. Isaac I. Hayes, the explorer, and others, while it is heartily approved, also by the honorable Secretary of the Navy; and your committee are inclined to commend it to the favor of Congress, more especially if its execution be intrusted, as the bill provides, to the President, under the direction of the National Academy of Science.

The entrance to Robeson's Channel, 81° N., can be readily reached by steam vessels. Surveys by the *Polaris* in 1871, and the *Alert* and *Discovery* in 1875, have been made to a point within four hundred miles of the pole.

As the *Polaris* was reaching the northern extremity of Robeson's Channel, there appeared what was seemingly, and what those best qualified to judge believed to be, an open Polar sea. This sea could have been reached had the vessel arrived at such point even an hour before, and the dream of explorers would have been a reality; but the adventurous party were forced back, and wintered but a short distance from the unexplored waters.

Captain Nares, in 1875-'76, encountered above this chan-

nel an unbroken field of ice, too solid to penetrate with vessels, too uneven to be traversed by sledge parties.

So, it will be observed, seasons there are no less variable than our own. Sometimes the mighty fields of ice are broken up and carried away by favoring tides; sometimes the ice presents an impassible barrier.

To succeed under such plans as have formerly been followed would be simply because chance supported them. To make success assured, the men and the vessels must be nigh the channel, ready for the fortunate hour, and prepared to take prompt advantage. To obviate the difficulty and meet the exigency, Polar colonization is declared the appropriate mode, and is therefore urged by the distinguished gentlemen we have named.

This plan requires that the colonization party should number at least fifty hardy, resolute men, enlisted in the United States for such service, provided with supplies and provisions for at least three years; that a strong, substantial building should be carried on ship-board; that the principal depot should be in Lady Franklin Bay, between 81° and 82° , or, if possible, as high as Cape Union, between latitude 82° and 83° ; the United States vessel to be used only for transporting men and supplies to the location of the colony, the vessel then to return to the United States, and afterward to make annual visits, with fresh supplies, and to keep the colony in communication with the outer world; military discipline to be enforced; three commissioned officers and two surgeons to be selected, with a view to their peculiar fitness; an astronomer and two or more naturalists to be selected by the National Academy of Sciences; and that one or more members of the regular force should be competent to make meteorological observations, and to communicate by telegraph and signals, when necessary.

Such are the main features of the plan, which also provides that all due precaution shall be had to afford safeguards against scurvy, against the ill effects of cold, and also to protect the colony from hunger.

In the vicinity of the point where the colony is to locate, coal abounds, game is plentiful, Esquimaux men can be had to re-enforce and guide the expeditionary corps, and Esquimaux dogs to draw the sledges. The men become acclimated after a few years, and Captain Hall, who was eight years among the Esquimaux, testifies that each year ended

found him better fitted to endure the severity of the Arctic Circle.

Other nations are at this moment hurrying forward exploring expeditions to be prosecuted under this plan.

Noble men in our own country are eager to enlist in the enterprise.

Intelligent and liberal capitalists are ready to give of their means to forward it.

There has never before been an opportunity afforded, so promising in results as the one which now presents itself.

To make such explorations entirely successful, it is essential that simultaneous observations be had at different points within the Arctic Circle, and for continuous periods of time.

England, during the present year, will fit out two vessels under the explorer Nares, on a Polar expedition via the east coast of Greenland.

Sweden, in 1878, under the auspices of Professor Norden-skjöld, will explore the Polar regions via Norway across to by way of Behring's Strait.

Holland has determined upon another.

Germany, under the direction of the Arctic Exploration Society, has an Obi expedition, commanded by Captain Wiggins, now on duty.

Russia, during the coming spring, will push forward an ethnological expedition, under the Helsingfors professor, to the Vogels and Ostyacs of the Obi and Irtysh.

And eminent explorers as well as scientific societies of all civilized countries are busying themselves in an endeavor to establish stations at different points in the Arctic regions with a view of systematic synchronous observations, which are absolutely essential, with a view to progress in scientific discoveries.

There is scarcely a natural science but would be enlarged and utilized by proper observations in the Polar seas. Natural forces there are subject to extreme conditions, and consequently produce phenomena not seen elsewhere, and which serve to unveil the character of the forces themselves.

Terrestrial magnetism, hitherto deemed a science of comparative unimportance, is now deemed the most consequential branch of physics; it is controlled by cosmical, atmospheric, and terrestrial action, and in the economy of nature exercises a reciprocal control.

Reliable observations show the existence of galvanic currents and the relationship between magnetic disturbances

and northern lights and earthquakes, while it is well known that magnetism is in inseparable connection with galvanism and electricity. In the extreme north the needle is rarely stationary. There, too, the wrathful storms rage as nowhere else. Such are the reasons why, if this intensely interesting science is to grow, observations must be had in that remote archipelago of ice.

Scarcely less interesting, and no less important to the world, than terrestrial magnetism is a knowledge of the atmosphere and its phenomena, especially their relation to heat and moisture, which is comprehended in meteorology. In the far north, and there only, can be ascertained the effect of that immense aggregation of ice; how heat is engendered and distributed; how dry and humid currents are created and put in motion to commingle and combat each other; to what extent climate is affected in this wise, and how hurricanes, which visit mankind with wrathful destruction, originate. Is it necessary to exhibit, by any process of reasoning, the utility of such knowledge, the advantages which would accumulate to science and to commerce?

The flattening of the earth at the Pole, and the extraordinary refractions there, would yield such opportunities for investigation as would enable us to measure the earth with greater accuracy, to correct lines of latitude and longitude, and also greatly facilitate the study of astronomy.

Natural history and botany would be vastly enriched, as is attested by the existence of rare flora and fauna.

Geology has found there the ground work of new theories, and the explanation of many old ones. In Siberia are found animals of anterior worlds, while in Nova Zembla, Spitzbergen, and Greenland are fossils so abundant and rare that the paleontologist exults in his enlarged sphere.

Wonderful already are the discoveries made in each field of inquiry noted; but we are yet in the vestibule. The region of the unknowable is just beyond; we are invited thither. We know enough to realize the wealth which awaits us.

Hitherto observations have been limited and imperfect, the most important of them wholly neglected; accurate data as to all of the sciences named are wanting.

Geographic discovery has hitherto been the objective point. While this is praiseworthy, while it adds a most important chapter to the book of knowledge, it should not be the primary object to which all others are subordinated.

An absolute change of operations must be had. This change will be effected by the passage of the bill H. R. 4,339. It meets the exact need. It provides for a long stay, which will give ample opportunity for observations and the conduct of scientific enquiry under the most favoring conditions. It provides that an intelligent system shall be pursued, under the direction of the National Academy of Sciences.

Ordinarily, the expeditions have been so conducted as to actually preclude scientific discovery—all appliances left at home, and almost continuous locomotion.

Other nations are adopting the same methods, and while American scientists are taking observations in the vicinity of Robeson's Strait, like observations will be taken in Behring's Strait, on the east coast of Greenland, in the vicinity of Spitzbergen, and at other points, simultaneously covering the whole field—belting the whole Arctic world—for several consecutive years.

Other nations are already there or getting in readiness to be there. The way through Smith's Sound, where De Haven, Kane, Hall, and Hayes, by their heroic researches, have given immortal glory to America, seems to be the fittest field for Americans in this race for conquest and discovery. It is familiar, and other fields are already chosen by other governments.

Dismiss the unsettled, vexed question, which is the most direct and practicable route to the Pole? Conditions vary. One year one is preferable, another, another; all are equally rich in scientific treasures, and will yield to searchers after knowledge an equal harvest, though the weight of testimony, even for geographical discovery, is in favor of the American route, as the exhibits appended indicate.

The plan which this bill contemplates happily blends geographical and scientific discovery; it will facilitate both, and result in both.

The importance of the fitting-out of this expedition at this particular time, with a view of co-operation with others, should not be out of mind, for meteorology depends upon comparison resulting from simultaneous observations. The laws of storms and the theories of winds depend upon such comparison. In no other mode can conclusive results be attained.

If we make any pretense as friends of science, we must pursue the only methods whereby development can be

achieved. Those methods have been pointed out. But supposing we should disregard the impulse of honor and glory; supposing we were controlled alone by the instinct of a supreme selfishness, which considers nothing but the questions, will it pay? will it help commerce? will it economize human life and property? there would still be sufficient reasons left to justify this undertaking.

We can support this statement sufficiently by accepting the testimony of Prof. Elias Loomis, of Yale College, who says, in his admirable letter, hereto appended:

The vast extension of the commerce of the world in recent times, and its increased security, are due in no small degree to more accurate information respecting the physics of the globe, including such subjects as the mean direction and force of the prevalent winds; the laws of storms; the use of the barometer in giving warning of approaching violent winds; the surest mode of escaping the violence of a storm when overtaken by a gale; the most advantageous route from one part to another; the direction and velocity of the current in every ocean; the variation of the magnetic needle in all latitudes, and its changes from year to year; together with many other problems; and most of these investigations have been greatly facilitated by observations which have been made within the Arctic regions. I do not regard it as any exaggeration to claim that the benefits which have resulted, both directly and indirectly, to the commerce of the world in consequence of Polar expeditions, are more than equal to all the money which has been expended on these enterprises.

Last year a whaling-fleet of twelve vessels was wrecked in the Arctic Sea, and property to the amount of half a million of dollars destroyed, all because of a lack of proper knowledge of climatic and tidal influences, which can alone be obtained by observations made in the manner provided for in this bill.

Business men have a keen appreciation of the importance of these explorations to commerce. They have always been anxious to aid them by liberal contributions. Some of them have been prosecuted solely by private means. The names of many merchants have been given to capes and bays and promontories and straits as vouchers of the fame they have so justly earned by intelligent devotion to science.

Boards of trade and chambers of commerce are now, through memorials, already before this committee, invoking us to pass this bill, and renew the honorable work.

The cost is slight. The ends aimed at will provoke no intelligent opposition. The methods proposed are not experimental, but the product of experience. They have the sanction and even the warmest commendation of all scientific men of all nations. The supervision of the National

Academy of Sciences will insure wise provisions and safeguards against accident, disease, or failure. Dr. Hayes, the eminent and successful Arctic explorer, coincides fully with the views herein expressed, as also do others familiar by actual experience.

The honor of the American name is involved. Will Congress suppress this zealous spirit of inquiry and adventure, or give it scope by the passage of this bill, and a meagre appropriation of fifty thousand dollars? To us it appears there should be but one answer, and, therefore, we report back the bill with the recommendation that it do pass.

APPENDIX 2.

The following letter is from a gentleman who was connected with Arctic exploring parties in the search for Sir John Franklin. He had the friendship and esteem of Dr. Elisha Kent Kane, and is often referred to in the works of that lamented gentleman :

ST. ANDREWS, MANITOBA, }
August 22d, 1877. }

To the Editor of the New London Telegram :

Sir: In a late issue of a local paper of this province I find that a Polar expedition is now in course of equipment, and will sail from New York in July next. As one who takes an interest in Arctic matters, having commanded one of Lady Franklin's private Arctic expeditions, will you kindly permit me, through you, to say by way of sympathy and encouragement to those going, that I consider such an enterprise as likely to be productive of two primary results.

I believe, in the first place, that from the highest northern points attained by Hall and Nares, the North Pole may be easily reached, and by sledges. To accomplish this it is only necessary to have proper men and other appropriate equipment. The men should be those accustomed to the use of snow shoe and sled. Their food should consist mainly of pemican and dried meat, prepared after the manner of the Red river buffalo hunters. Such food is compact, nu-

tritious, and not likely to give scurvy. Their clothing should be strong, woolen underclothing, with dressed moose-skin, or its nearest equivalent, as outer garments. As foot gear nothing can equal the Indian moccasin.

To be prepared for every eventuality they should be provided with two kinds of sledges—the *Esquimaux* sled, which has runners, and the Indian flat sled. The first is best fitted for running over crusted snow, the other over soft snow, such as Nares found. The fuel for journeys should be spirits of wine, and snow houses for shelter, instead of tents; the beverage only tea and coffee—no spirits whatsoever.

Being thus provided and setting out due north, say on the first of April, March, in so high a latitude, would be too cold, say from latitude 80° north, they would have four months before them for accomplishing the distance of twelve hundred miles—a feat that has already been accomplished. Instead of an open “polar sea” it is most likely the party would find a glacier-covered land to travel over. The unusually heavy ice that Sir G. Nares met with, is to be indicative of land-formed ice, precisely similar to that found in the Antarctic region.

The “open polar sea” will, I believe, be in the end found to be the tail end of the gulf stream. This current entering the Arctic regions between Iceland and Nova Zembla, I believe, sweeps westward after meeting with northern unknown lands and ultimately finding its way to Robeson’s (of Nares) channel, enters that and so passes southward through Baffin’s Bay into the Atlantic.

A stream like this can alone account for Arctic summer birds, in going north in autumn and south in spring, in going to and returning from their winter haunts. They may fairly be supposed to round the northern coast line of Greenland, being thus guided by the higher temperature both of the water and the atmosphere in this, the supposed termination of the gulf stream.

Cold, dismal, and uninviting as the Smith Sound region is, it nevertheless has its undeveloped resources no less than other countries. The walrus seem to be abundant in that region, also the polar bear, the musk ox, the reindeer, and other animals. With the aid of the *Esquimaux*, provided with the proper requisites for it, they might procure large numbers of these animals. The seam of coal discovered by

Nares would supply a first requisite for a comfortable fire-side.

The expedition should carry with it presents for the Esquimaux, such as saws, axes, knives, fish-hooks, awls, gimlets, drills, files, needles, and other utensils. The Esquimaux discovered by the late lamented Dr. Kane are United States citizens, and must be living in that state that geologists describe as the "stone and iron age." Any tool, therefore, with an edge to it must be of incalculable value to such a people. With a moderate supply of these, but more than all, with guns and ammunition, such as we may suppose to be stored in United States stores, as now useless relics of the late war, how much might be done to incorporate "the less advanced with the more progressive man," and so turn to account that which is at present as if it were not in existence.

Very truly yours,

WILLIAM KENNEDY,

Late Commanding Lady Franklin's Private Arctic Expedition.

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